



John Mueller &lt;john@keweenawresort.com&gt;

## Keweenaw Mountain Lodge IDSP Review

1 message

**Ashley Wilson** <ashley@darksky.org>  
To: John Mueller <john@keweenawresort.com>

Mon, Nov 8, 2021 at 5:53 PM

Hi John,

I hope all is well with you, and thank you for being patient with my feedback. I find it is becoming more difficult to respond to emails and other responsibilities in a timely manner.

I have now been able to provide a thorough look at your application. The good news is I feel this application is complete enough to be considered for our November deadline. I am attaching my checklist, which denotes what I found, what I didn't find, and items that I think could use more information. I am also including my list of notes in this email for your convenience.

The biggest items that I need to still see are an updated LMP (similar to the link I provide in the checklist), an updated lighting compliance rate, robust outreach descriptions, and acknowledging how you will address future threats outside of the Park. To be honest, I think the biggest item the Committee will want to discuss will be your night sky monitoring data, but at this point, I'm not sure if there is anything else I can do to help. Fortunately, the question won't be whether you are eligible to apply as a Park, so that shouldn't be a big concern.

With Thanksgiving coming up soon and the other lengthy reviews I am working on, I am extending your final deadline (as in completely done with no more revisions) to mid-December. Once I finish these initial reviews, I will make working on your nomination a priority to finish you up.

If you have any questions about my comments, please email me or request a time to schedule a Zoom or phone call. My schedule will open up the week after Thanksgiving, so please let me know what you need from me to finish your application so we may move on to the next step.

### Ashley's Comments: November 8, 2021

1. I would like to see more detail in how you are providing public interpretation for your street light project. The webcams and the blog post are a great start, but do guests know to pay attention to the lights while on site? In your materials, can you provide details of the specifications of choosing the best lighting fixture (warm CCT, shielding, targeting, did you include any adaptive controls like dimmers or timers, etc.)? Maybe talk a bit more about the grant you received from the EGLE grant, and if it is possible for others to apply, would you be able to provide some guidance for that resource? Can these materials be presented in an interpretive sign, brochures, etc. for those who are at the facility? The main point is we want a Park's visitors to see and feel dark-sky friendly lighting, so it is just as important that they experience and learn from your fixtures as much as it is to see the night sky.
2. The Lighting Management Plan is not direct. There should be a document specifically outlining all of your policies related to lighting, and not lumped together in sections. The document should also have the signature of the management agency (or in this case if the Lodge has a board or manager, etc.) and the date the plan was formally approved. Here is an example of a recently approved application that demonstrates what we are looking for: <https://darksky.box.com/s/krxpztqpsyrwe7vmzndr2v42l4feus59> (pp. 24-26)
3. John B neglected to point this out in his previous review, but we also need to see "Policy in park management documents (B, i)". If you use the link I provided as another example, they had their Board write and sign a resolution supporting the Dark Sky Park (page 16). If you could procure something like this, or show evidence of relevant Lodge documents that demonstrate "Park management documents supporting dark skies and/or the natural nighttime environment as a valued resource," that would be great.
4. To help clarify your sections, keep the LMP items separate from the inventory. All of your policies should be directly stated before getting into the inventory.
5. Per our Guidelines, illuminated signs are defined as, "any informational or advertising display that is illuminated by either internal or external means. Descriptive terms are adjusted here accordingly according to the type of

- illumination.” Therefore, the external sign lights at the Park’s entrance count towards this, and your LMP needs to have language that reflects your active policy on these lights. If these lights are necessary to be kept strictly for wayfinding or identification of concessions in the Park during normal business hours, then state that in the LMP and when the sign will be turned off.
6. Note 3 in your inventory (p. 36) states that your entrance sign is not fully dark-sky friendly, which contradicts other language in your application (i.e. stating you could argue being 100% dark-sky friendly and especially in the LMP where you work around not using the sign lighting language). Please update and make sure to reflect this in the true percentage of compliant lighting (p. 32), along with my notes from item #10.
  7. If you have holiday lighting, we need to see provisions in your Temporary lighting section that limits when they are visible. The most common example I see is a 60 day period from November 15 - January 15. I also recommend including the following language pertaining to string lighting: “allowable light output will not exceed 70 initial lamp lumens or 125 lumens per linear foot of line or square foot of space.”
  8. If you’re using motion sensors to make fixtures compliant, the LMP needs to clearly state that these fixtures cannot be on longer for 5 minutes at a time.
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  10. A few things you have listed in the inventory are not compliant:
    - a. The angle of the Metal Halide fixtures appear to be cast at an angle, causing upward light radiance. You also do not have CCT accounted for (which should be its own column). Is 20,000lm per fixture really appropriate and needed?
    - b. Notes 2 and 5 state that the wall packs are not fully compliant, so don’t label it as such in your inventory. This should also say ‘no’ in the fully shielded? column.
    - c. You even state in the notes that the entrance sign is not dark-sky friendly. Update.
    - d. I can’t see the second road sign fixture. Need a closer, cleaner image to verify.
    - e. The cabin porches are just CFL bulbs. You need to document evidence that the structure is completely shielding the light from all angles to prove this. Otherwise, not compliant.
    - f. Your solar cabin porche fixtures use 3500K when your LMP restricts all lighting to use 3000K or less. Not compliant.
    - g. The fixture at the employee housing looks like a glass container, so no actual shielding is directing the light.
    - h. Don’t include seasonal or temporary lighting in your inventory.
  11. Once you have solidified your compliance rate, provide an updated account of when and how you believe you will meet the 90% and 100% compliance rate benchmarks.
  12. Night sky monitoring data: a) Clearly state who is taking annual measurements, b) provide camera settings for your horizon photography, c) state you are using Fahrenheit for temperature readings. For future readings, please note all environmental conditions (i.e. moon position below the horizon, cloud cover (especially after dark adapting first for 1-2 hours), humidity), as that will help explain the anomalies.
  13. You are missing a section that provides information for “A description of current and suspected future threats to dark skies over the park.” You allude to this with the radiance map on page 23, so please talk about your next steps once you are a certified Park to spread your presence and awareness of the dark-sky movement outside of your boundaries.
  14. The outreach section does not provide a strong argument for your long-term commitment to this requirement. See my notes in the corresponding outreach section and suggestions on how to enhance it.
  15. If you have any other materials/handouts that you have created, social media posts, etc. about dark skies, that would be an excellent addition to your appendix.
  16. Minor comment - capitalize all use of National Parks on pg. 19

Kind regards,  
Ashley

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**Ashley Wilson, MS, NAILD LS I** | Director of Conservation  
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 **Checklist November 8 2021.docx**  
299K

## International Dark Sky Park Application Review Checklist (2018 Guidelines Version)

**Proposed Park:** Keweenaw Mountain Lodge  
**Submitted by:** John Mueller and Mariah Summers  
**Affiliation:** KML  
**Reviewer:** Ashley Wilson  
**Date:** 08 Nov 2021  
**Provisional?** NO

	YES	NO	PAGES
<b>Table of Contents</b>	✓		2
<b>Letter of Introduction</b> ( <i>executive summary</i> )	✓		7-8
<b>IDA Member Letter of Nomination</b> (B) Author/affiliation: John Mueller/KML	✓		6
<b>Superintendent Letter of Support</b> (C)	✓		6
<b>Letter(s) of Support (2 REQUIRED)</b> See complete list on page 3 of this document.	✓		41-53
<b>Map(s) of area to be designated</b> (A) 32	✓		7, 10, 14-15, 31-
<b>Description of area indicated on map(s)</b> Total land area: 177 acres Ownership: 100% private	✓		9-20
<b>Evidence of public access?</b> “As part of the deed restriction on the property, along with the Lodge being on the national register of historical places, the resort is accessible to the public for lodging, dining, and outdoor activities, including stargazing. Thus, public nighttime access to the site is not preconditioned on visitors availing themselves of paid amenities, such as lodging stays” (p. 7); “The general public is able to access the property at night, and do not have to be lodging guests. Public nighttime access on the property is not preconditioned on visitors availing themselves of paid amenities of the Lodge.” (p. 13)	✓		7, 13
If a subunit of a larger park is to be designated, is there evidence of the IDSPP Manager's approval?	n/a	n/a	
<b>Policy in park management documents</b> (B, i)		✗	

**Lightscape Management Plan**

✗ 31;37-38?

See my notes below.

Warranting? (A, ii) ✓ ✗ 27

*“Our overall philosophy of light management on the Lodge property is to only use lighting where and when it is needed, and when it is needed do so in an appropriate amount for the specified task required.” We need a clearer description of what constitutes a “need” for lighting and how the decision to use light will be made, as well as what guides decisions about how much light is “required” for particular tasks.*

500 lumen unshielded light limit? (A, iii) ✓ 27, 32

*“When needed, outdoor lighting fixtures are fully shielded.” (p. 27) “Outside lighting [must] be dark-sky compliant: fully shielded.” (p. 32)*

≤3000K CCT limit? (A, iv) OR ✓ 27, 32

≤25% of spectral power released at 550 nm (A, iv) OR  
S/P Ratio < 1.3 (A, iv)

*“When needed, outdoor lighting fixtures are ... 3,000K color temperature or less.” (p. 27) “Outside lighting [must] be dark-sky compliant: ... 3,000K color temperature or less.” (p. 32)*

Meets or surpasses local laws? (A, v) ✓ 38-40

*“Our lighting meets or surpasses the lighting ordinances for Keweenaw County.” An excerpt from the county code is reproduced in pages 38-40.*

Regulations for visitor nighttime use of light? (A, vi) ~ 37

*Summary of suggested use of red flashlights and pointing downward.*

*Please include a provision for prohibiting light painting.*

Temporary lighting policy statements? (A, viii) ✓ 38

*Any temporary installation of outside lighting will adhere to the dark-sky compliant guidelines to the greatest possible extent, and whose duration will be limited to the shortest possible time*

**Illuminated Sign Regulations**

**✗**

Operation is prohibited from one hour after local sunset to one hour before local sunrise (unless strictly required for wayfinding or identification of concessions in the Park during normal business hours) (A, vii); **AND** [L]  
[SEP]

Displays single-color on a black background (A, vii); **AND**

Luminance after sunset must not exceed 100 nits (100 candelas per sq. meter) (A, vii); **AND**

The luminous/illuminated surface area of an individual sign must not exceed 200 square feet (18.6 square meters) (A, vii)

*Listed but claims it does not apply to existing signs when it does. See my notes below.*

**Lighting Inventory**  
(summary)

✓

32-37

34-36 (data)

**Lighting Compliance**

2/3 of existing lighting in compliance? (B, ii)

✓

32

Total number of fixtures inventoried: 164

Number compliant: 137 (83.5%)?

Number not compliant: 27 (16.5%)?

*In addition, there are a variable number of string lights declared in the inventory on p. 31.*

Documentation of plan to bring 90% of outdoor lighting into compliance within 5 years (B, iii)

✓

**✗**

31

*Plans for retrofits are described in the notes on page 31, but there is no schedule given for completing the retrofits.*

**Night sky quality measurement report** (no page limit) ✓ 23- 24; 39-45; 68-73

Mean zenith sky brightness:  $21.6 \pm 0.2$  mags<sub>SQM</sub>/arcsec<sup>2</sup>  
 Which measures were used? *Radiancance satellite data from lightpollutionmap.info* (p. 23- 24); *SQM* (pp. 40-42); *horizon photography* (pp. 44-45). *Additional SQM measurements made “from surrounding areas” are reported on p. 43. Raw data provided* (pp. 68-70); *John Barentine’s analysis (using data up to May 2021)* pp. 71-73

Monitoring program? (B, iv) ✗

By whom: **Not stated.**

*Please include camera settings of your horizon photography.*  
*In your SQM tables, include the mode of temperature in the column description (assuming Fahrenheit).*

**Light pollution control community projects** (10 p. limit) (B, v) ✓ ~ 22-27

Producing at least one “night sky friendly” lighting project that is publicly visible and interpreted, **OR**

Involving at least two external partners in dark sky restoration efforts, **OR**

Cooperation with at least two nearby municipalities that results in adoption of lighting codes that improve sky conditions in the Park, **OR**

A combination of the above or an alternative restoration project

Projects: *Streetlight replacement near the lodge; unclear whether it is “interpreted” to guests; See my notes below*

**Outreach program** (10 pages) (C, i) ✓ ✗ 46

Examples: star parties, interpretive programs focused on dark skies protection, public/museum exhibits, educational programming, dark skies tourism. Must mention light pollution **AND** IDA in programming

Elements: Night Sky Photo Workshop and New Moon Viewing Parties (Monthly June-August 2021); Dark Sky Light Management workshop (Nov 3, 2021) (exactly 4 events this year alone)

*If you submitted your application the first time in early 2021, didn't you hold events in 2020? Can you add any other previous dark-sky related events to bolster the argument that you are committed to providing this resource?*

*-What are the topics of your night sky interpretive talks? Do they vary in topic (e.g. wildlife, culture/heritage, human health, etc.)? When did these occur? I don't see them in the table you provided. We don't want to see just 'night sky' talks every single time. Try to branch out and educate and engage with your audience about the many ways light pollution impacts our lives.*

*-If you had your first lighting management workshop this month, please provide a synopsis with photos of who attended and the solutions provided at the event.*

*Please separate the completed items from those that have yet to occur (such as the section with the Astronomy Clubs & Observatories), dark sky star parties, partnerships, etc.*

Dedicated programming occurs ≥4 times/year? (C, ii) ✗

**A description of current and suspected future threats to dark skies over the park (4)** ✗

**Evidence of "broad community support"** ✓ Letters;  
52

**References (if applicable)** n/a n/a

**Letters of Support**

<b>Author</b>	<b>Affiliation</b>		
1. Brad Barnett	Keweenaw Convention & Visitors Bureau		41
2. Sam Raymond	Keweenaw Adventure Company		42
3. Nathan Miller	Copper Harbor Trails Club	43	
4. Jeff Ratcliffe	Keweenaw Economic Development Alliance		44
5. Don and Peg Kauppi	Mariner North		45
6. Bob Wild	Fort Wilkins State Historic Park		46
7. Scott Wendt	Grant Township		47
8. Julie Stoneman	Michigan Nature Association		48
9. Gina Nicholas	Keweenaw Community Forest Company		49
10. Charlie Eschbach	Estivant Pines, Keweenaw Traveler publisher		50
11. Don Piche	Keweenaw County		51
12. Troy Morris	Kall Morris Inc		52



13. Dave Lorenz	Pure Michigan	53
14. Lonie Gliberman, President, Mount Bohemia Ski Resort		##

**Notes:**

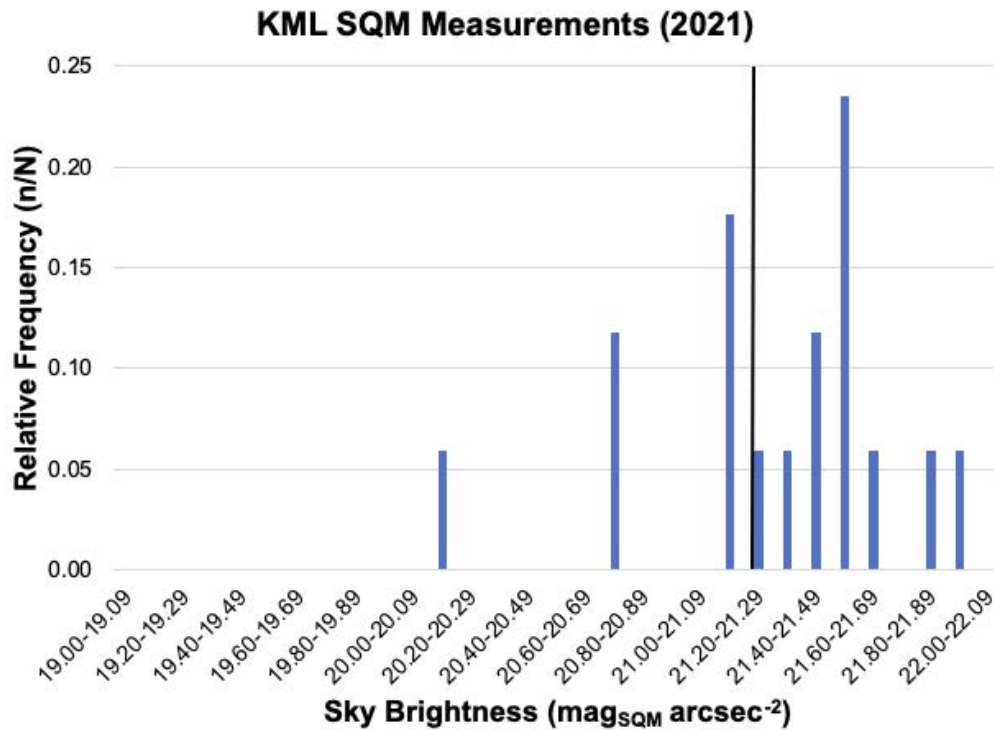
- Description of additional 380-acre property adjacent to the lodge that it may acquire in coming years (p. 54) and a proposed 15,800-acre Michigan DNR land purchase what would become the state’s third-largest state park (pp. 55-56)

**RECOMMENDATION**       **Forward to committee as-is**  
 **Return to authors with the following suggested changes:**  
 **Other** (specify: \_\_\_\_\_)

1. Some of the maps (e.g., p. 10) are pretty small and difficult to read. Make these larger if possible to improve legibility.  
*Look good now.*
2. We need a clear statement about the nature of public access to the property, in particular whether access is preconditioned on paying for services at the lodge.  
*Resolved*
3. I’m puzzled by your sky brightness readings (pp. 33-34). When plotted as a frequency distribution (see below), they are much more scattered than I expected them to be. While there could be user error – and measurements taken on some night (e.g., 2/18/21; 2/20/21) – I actually suspect that snow on the ground might be amplifying the lights on site and making the apparent night sky brightness higher than it expected. What were the other weather conditions like, besides temperature? Any clouds in the sky? Looks like it’s probably not moonlight interference. I think you measured correctly, but it just seems like the sky there should be darker than what you measured. So I encourage you to keep measuring, especially around the upcoming dark of the moon (~5 to 15 June), so we can understand better whether in fact snow was the culprit.  
*Interestingly, your June measurements are another anomaly. Despite John’s suggestions, no environmental conditions are reported. This will be your biggest hurdle in the DSPC review.*
4. Did you use the SQM (big red button on the front) or the SQM-L (no big red button on the front) to make the night sky brightness measurements?  
*SQM confirmed.*
5. You mention on page 33 that the numbers reported in the night sky brightness measurement table are “median[s] of the readings, which included 3 to 6 each.” If you have the complete, raw data, please include them in the report for the record (i.e., not just



the medians). The result will be better in a statistical sense. And if you can send those to me now, it would help with the analysis discussed above.



*John's analysis is now included in the Appendix.*

**RECOMMENDATION** November 8, 2021

**Return to authors with the following suggested changes:**  
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